

# South African Medical Journal

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### CONSERVATIVE SURGERY OF HYDRONEPHROSIS\*

H. CURRIE BRAYSHAW, M.B., Ch.B., F.R.C.S., (EDIN.), F.R.C.S., (ENG.).

*Surgeon in Charge, Department of Urology, Johannesburg Hospital*

In presenting a paper on hydronephrosis, I am not going to attempt to deal with the whole subject, but rather, to put before you certain facts in regard to the physiology and pathology which I hope will clear up certain mis-statements on the subject which are constantly made, and put forward a plea for more conservative renal surgery.

The structural changes in a kidney resulting from back pressure and known as hydronephrotic atrophy are essentially the same whether the obstruction is complete or partial, permanent or temporary, high or low—the difference in their development is simply one of rate and degree.

It is commonly stated that, if the obstruction is complete, e.g. ligating a ureter, the kidney atrophies. This statement is absolutely incorrect—primary atrophy occurs under certain circumstances. The usual effect is progressive hydronephrosis or as it is sometimes called, 'pressure atrophy'. In practice and experimentally, primary atrophy with anuria occurs occasionally but only in the presence of infection. In a complete obstruction, once the intrapelvic pressure equals the glomerular or secretory pressure, no further secretion of urine would occur, and primary atrophy would occur; but there is a counter-play between glomerular secretion and tubular absorption which permits secretion to continue and maintain an intrapelvic pressure sufficient to produce hydronephrosis. Hinman has made a careful study of the factors involved in reabsorption and has proved, beyond doubt, that absorption takes place firstly through

the tubule and secondly through the lymphatics. Pyelovenous back flow has also been suggested as a possible route, but this is not generally accepted. Associated with the pelvic distension there is early and generalised tubular dilatation and, in turn, there is compression and thinning out of the arterial tree with ischaemia and nutritional disturbance which leads to tubular collapse and anaemic atrophy which in turn, favours a more rapid dilatation.

Experimentally it has been shown that if the renal artery is compressed, the hydronephrosis develops more rapidly. This is also seen where a small aberrant vessel is tied, producing a renal infarct and, if the ureter is obstructed, the increased pelvic pressure causes a blow-out and an enormous sacculation of the infarcted area results. Thus, while back pressure is the essential factor, anaemic atrophy is the more active and controlling influence in producing the changes of hydronephrotic atrophy.

In partial obstruction hypertrophy of the muscular coat of the pelvis takes place and it is only when this compensation breaks down that dilatation occurs, but it is in the partial or intermittent obstruction that the hydronephrosis may reach an enormous size. The presence of infection modifies the development of hydronephrosis, and the process of repair, if it occurs early, may lead to primary atrophy without hydronephrosis and it is an important factor in the failure of operations for the relief of hydronephrosis.

Before discussing the types of obstruction which may cause hydronephrosis, it is important to mention a few facts in regard to the physiology of the renal pelvis and ureter. There is muscular tissue in the walls of the

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pelvis and ureter. Peristaltic waves of contraction, commencing in the pelvis and passing down the ureter, propel the urine from the kidney to the bladder. A very important question arises: What is the nervous physiological action that explains ureteral peristalsis? Neurones of the sympathetic and parasympathetic system have been demonstrated in the muscular coat of the ureter; it has been proved that the nerve supply of the ureter is independent of that of the kidney and bladder, and that this supply comes from the lowest renal ganglion and abdominal sympathetics.

It has also been shown that after blocking the sympathetic and parasympathetics by the use of tetra-ethyl ammonium, peristalsis continues along the ureters and surgically the ureters can be isolated from the surrounding structures along their entire course, and yet peristalsis remains unchanged although, presumably, all the nerve fibres running to the ureter from the abdominal sympathetics have been severed.

In view of these experiments it is claimed that ureteral peristalsis is an autonomous property of the musculature of the ureter. I mention this, for many critics of plastic operations on the ureter and pelvis, contend that failure is due to the interruption of nervous impulses and interference with peristalsis, while others claim that failure is due to faulty technique resulting in the deposition of fibrous tissue.

Having considered the intrinsic changes occurring in hydronephrosis, let us pass to the causes of obstruction at the pelvi-ureteric junction. There are probably 25 or 30 conditions causing hydronephrosis, e.g. impacted stones, etc., but in this short paper I am confining my remarks to pelvi-ureteric obstruction.

Before discussing details of the various types, I should like to stress the importance of careful pre-operative investigation. In no branch of surgery is it more important to take a very careful and detailed history, microscopic and cultural examination of the urine is essential. Intravenous pyelography, while it may exclude the possibility of hydronephrosis, does not give one all the information that is necessary, and a retrograde pyelogram has to be done. I, personally, prefer to do this under a local anaesthetic for if a general anaesthetic, even sodium pentothal, is given, the patient is depleted of fluids, the secretion from the kidneys is scanty, and so the examination is interfered with.

At cystoscopy a specimen of the bladder urine is taken for culture, a careful examination of the bladder and ureteric orifices is made, No. 10 Benique whistle-tip catheters are passed up each ureter to the renal pelvis, and samples of urine collected for examination. If a hydronephrosis is suspected, the urine should be aspirated from the pelvis and the quantity withdrawn noted. At this stage it may be advisable to do a P.S.P. test, urine being collected from each kidney for 15 minutes, a note being made of the appearance time of the dye from each kidney. The catheters are then withdrawn so that the tip lies opposite the third or fourth transverse process. A plain X-ray is then taken, after which 6 c.c. of sodium iodide are injected and a second picture taken. This usually gives a complete picture of the renal pelvis and ureter. If a hydrone-

phrosis is present, it may be necessary to inject more dye to obtain a complete picture, but the quantity injected should not be more than the amount aspirated, which represents the normal residual of that hydronephrosis; it is always possible to inject three or four times that amount without causing pain, but this must cause damage by rapidly increasing the intrapelvic pressure. Satisfactory pictures having been obtained, a further series should be taken at 5, 10, 15 and 20 minutes to estimate whether there is any delay in emptying of the renal pelvis. This is essential and in cases of nephrop-tosis, pictures must be taken in the upright position. Normally, the kidney will empty in under five minutes, but if the patient has been depleted of fluids possibly for 12 hours, the secretion of urine is so slow that dye may still be present 10-12 minutes later.

Using this technique, the pelvi-ureteric junction is always shown up and if an obstruction is present it is clearly shown, as the ureter below the obstruction empties rapidly through the catheter.

We have now sufficient information to decide whether operation is necessary, or whether dilatation by the passage of ureteric bulbs should be tried first. The type of operation to be performed can only be decided when the renal pelvis, and upper ureter have been explored.

#### TYPES OF OBSTRUCTION

##### A. Extrinsic Causes:

- (1) Congenital aberrant vessel.
- (2) Fibrous bands.
- (3) Sclerosing peri-ureteritis.
- (4) Nephrop-tosis and kinking of ureter.

##### B. Intrinsic Causes:

- (1) Congenital stricture.
- (2) Hypertrophy of musculature.
- (3) Valves.
- (4) High insertion of the ureter.

#### ABERRANT VESSELS

For many years a bitter battle has been fought over the question of aberrant vessels. The battle has been between general surgeons and urologists, for the majority of urologists agree that an aberrant vessel running across the ureter can and does cause obstruction. The other school argues that the distended hydronephrotic pelvis, as it enlarges, comes into contact with the vessel which comes to lie in a deep groove on the surface of the hydronephrotic sac.

In these cases the ureter is usually kinked over the vessel and the upper half inch or so of the ureter is compressed against and adherent to the pelvis, and after the aberrant vessel is dissected free and displaced or divided, the adhesions binding the ureter to the pelvis have to be carefully dissected before the ureter can be straightened out and the obstruction removed. In these cases it is seldom possible to find any other cause of obstruction, in many we have opened the pelvis and viewed the opening of the ureter from within, but in all of them there has been a perfect funnel through which a 10 or 12 F. bougie passes easily. Before dividing an

aberrant vessel, it is important to determine how much of the kidney substance will be infarcted—this can readily be done by isolating and compressing the accompanying vein, and the area affected turns blue. Small vessels may be divided, the only danger being infection of the infarcted area with subsequent abscess formation. In the case of large vessels it may be better to divide the ureter and transplant it in a position where it will not be compressed, and a nephropexy done to maintain the kidney in the best position.

#### FIBROUS BANDS: SCLEROSING PERINEPHRITIS

These require careful dissection, for often the fibrous tissue is firmly adherent to the ureter and the greatest care must be taken not to damage the wall of the ureter.

#### NEPHROPTOSIS

The operation of nephropexy got into disrepute as a result of its use in every case of nephroptosis, whether causing obstruction or not, and often when part of a general visceroptosis. The only justification for operating on a nephroptosis is when kinking of the ureter occurs causing obstruction, for unless this occurs, mere ptosis will cause symptoms. Retrograde pyelography with pictures taken in the upright position to estimate whether there is delay in emptying, and possible signs of back pressure, is the only way to determine whether the operation is necessary.

As regards the operation of nephropexy, it must be remembered that the kidney is contained within the perirenal envelope which is closed above and open below, and normally the kidney moves up and down on respiration. Many operations devised for nephroptosis such as tying the kidney to the ribs, etc., fix the kidney and do not allow of respiratory movement, and consequently the patient gets no relief. The operation advocated by Clyde Deming is very simple and effective and consists of closing the renal envelope below by two layers of sutures. This keeps the kidney in good position and yet allows of the normal respiratory movement, and in our hands, has given very excellent results.

We now come to the group of intrinsic causes of obstruction, and these are the most difficult to deal with. The first attempt at a plastic operation for the relief of hydronephrosis, was made by van Trendelenburg as long ago as 1886; this stimulated interest in the subject and it is of interest that at the International Congress of Medicine held in Paris in 1900 a Symposium was held on the subject. I will not bore you with a historical review and a description of the many operations suggested, most of which have been based on the plastic operations performed for pyloric obstruction. Feuger adapted the Heinecke-Mikulicz operation of making vertical incision through the stenosis and sewing it up transversely—this however, leads to buckling of the opposite wall and consequent failure. Küster in 1891, advocated division of the ureter and re-implantation into the most dependent part of the pelvis. Lateral anastomosis was also attempted, the Finney pyloroplasty used for pyloric stenosis was also adapted to overcome the uretero-pelvic obstruction. Most of these

procedures proved a failure for the obvious reason that the pioneers were handicapped by the fact that, unassisted by X-rays and pyelography, cases were only diagnosed in the advanced stage when the atrophic and circulatory changes were too advanced to permit of recovery even when the plastic operation had been successfully performed. Enthusiasm waned, and it was not until 1916 when Schwyzer's work was published, that interest in the subject was revived.

He adapted Durante's Y plasty. This was an attempt to overcome the buckling which occurs in the Feuger operation. Subsequently, this was combined with the Finney type of operation by Foley in what is to-day known as the Foley Y plasty. The Rammstedt operation has proved most successful in obstruction due to a hypertrophied ring of muscle.

Numerous ingenious plastic procedures have been advocated, all of which aim at giving a good funnel-shaped exit from the most dependent part of the renal pelvis with or without excision of the redundant renal pelvis. Most of these procedures have their place in surgery, yet why so many failures? I think these can be attributed to the following causes:

1. Unsuitable cases where the hydronephrotic atrophy has gone too far—although it is truly amazing how a kidney can recover.
2. Leakage of urine—urine is extremely toxic, retards healing and leads to the laying down of fibrous tissue with consequent stricture formation.
3. Sepsis—this plays havoc with a kidney already suffering from the effects of back pressure.

A technique has thus been evolved which in our hands has met with success. The type of plastic operation employed, depends entirely on the case and can be decided upon when the pelvis, ureter, etc. have been dissected free and all adhesions carefully separated. The Rammstedt operation can be done without opening the pelvis to view the opening from within to make sure there is no valvular obstruction; in this operation no splint is required, nor drainage of the pelvis. In the other operations involving some plastic procedure 00000 chromic gut on an eyeless needle is used, mattress sutures to evert the mucous membrane are inserted so that the urine does not come in contact with any cut edge, and we usually employ a splint in the form of a fine latex tube about No. 12 or 14 F. with numerous perforations in the portion lying in the pelvis and ureter. This tube we usually bring out through the kidney substance via the lower calyx and it is connected up to a form of closed drainage to avoid as far as possible the introduction of infection. Dr. Clyde Deming, one of the greatest exponents of renal plastic surgery, condemns the use of drainage of the pelvis in uninfected cases.

The gall-bladder T tube may also be used, being inserted into the ureter, well below the anastomosis. When a splint is used it is left in position for 10-14 days, and as a rule, when the tube is removed, the fistula heals within 24 hours. To combat infection, penicillin and sulphonamides are used before and throughout the after-treatment.



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## Suid-Afrikaanse Tydskrif vir Geneeskunde

### EDITORIAL

#### PROTEIN IN HEALTH AND DISEASE

In this issue of the *Journal* we publish an interesting paper by Dr. F. W. Fox, a very distinguished South African biochemist. Dr. Fox has drawn attention to the need to revise our old-fashioned rules-of-thumb in estimating the protein requirements of man. He points out that for the healthy adult male 'we need no longer use the old empirical standard "70 gm. of protein daily", but must try to provide at least the recommended allowance for the eight amino acids known to be essential'.

Interest in the use of proteins in medical treatment is no longer only of theoretical importance. Specific proteins are essential for enzymes, hormones and antibodies. Growth depends upon an adequate protein intake; the daily wear and tear of the body is made good by drawing upon protein. The immense nutritional tax made by pregnancy is but another example where the supplies of proteins are of primary importance.

Modern knowledge has given us an insight not only into the protein requirements of the healthy adult, but also of the special needs of the sick and the convalescent, when progress may well be greatly influenced by the available supplies and quality of these basic raw materials.

In some diseases the disturbance that occurs in protein metabolism is of fundamental importance. The role of proteins in resistance to infection and in phagocytic activity is yet another aspect of this problem.

Recognition of the importance of protein intake has already modified the treatment of such conditions as burns, fractures and certain types of renal disease, and it is likely that we have now reached the stage where the concern of the nutritional expert about minimal and optimal requirements for health should be duplicated in the general practice of physicians and surgeons in regard to disease.

Dr. Fox has also drawn attention to the significance of the well-known principle enunciated by Block that: 'The addition of small amounts of lysine to whole wheat or to white flour will more than double their nutritive and biological value, converting them from inferior protein foods to foods having a nutritional value almost as good as many of the more expensive animal protein foods.'

### VAN DIE REDAKSIE

#### PROTEÏEN IN GESONDHEID EN SIEKTE

In hierdie uitgawe van die *Tydskrif* publiseer ons 'n interessante verhandeling deur dr. F. W. Fox, 'n Suid-Afrikaanse biochemikus van hoë onderskeiding. Dr. Fox bepaal die aandag by die noodsaaklikheid daarvan om ons ouderwetse praktykreëls vir die vasstelling van die proteïenbehoefte van die mens in hersiening te neem. Hy wys daarop dat ons vir die gesonde volwasse man nie langer die ou empiriese maatstaf van 70 gm. proteïen per dag' hoef toe te pas nie, maar dat ons moet probeer om minstens die aanbevole hoeveelheid vir die ag aminosure wat, sover bekend, noodsaaklik is, te verskaf.

Belangstelling in die gebruik van proteïene in geneeskundige behandeling bestaan nie meer slegs in die teorie nie. Bepaalde proteïene is noodsaaklik vir ensieme, hormone en teenstowwe. Groei hang af van die opname van genoeg proteïene; die daaglikse slytasie van die liggaam word teëgewerk deur van proteïene gebruik te maak. Die geweldige voedingseise wat swangerskap stel is nog een van die talryke voorbeelde waar die proteïene-voorraad van die eerste belang is.

Die kennis waarom ons vandag beskik gee ons 'n besef nie net van die proteïenbehoefte van die gesonde volwasse nie, maar ook van die besondere behoeftes van siekes en herstellendes by wie die vordering wat hulle maak grootliks kan afhang van die beskikbare voorrade en gehalte van hierdie fundamentele grondstowwe.

In sommige siektes is die steuring van proteïenstofwisseling van fundamentele belang. Die rol wat proteïene speel in die bestryding van besmetting en die bedrywigheid van fagosiete is nog 'n ander aspek van hierdie vraagstuk.

Die erkenning van die belangrikheid van proteïenopname het reeds aanleiding gegee tot wysiging van die behandeling van toestande soos brandwonde, breuke en sekere soorte nierkwaal, en ons het waarskynlik nou die stadium bereik waar die besorgdheid van die voedingsdeskundige oor die minimale en gunstigste vereistes vir gesondheid oorgedra behoort te word op die algemene praktyk van interniste en chirurges sover dit siekte betref.

Dr. Fox bepaal ook die aandag by die betekenisvolheid van die bekende beginsel wat deur Block vasgestel is, naamlik dat wanneer klein hoeveelhede lisien by sak- of fynmeel gevoeg word dit die voedings- en biologiese waarde daarvan meer dan verdubbel en hulle van minderwaardige proteïenvoedsel omset in voedingstowwe met 'n voedingswaarde wat byna so groot is as dié van baie van die duurder dierlike proteïenvoedselsoorte.

This technique of dietary enhancement may have far-reaching effects when applied to feeding problems in a country such as South Africa, with its large undernourished Native population subsisting on such inadequate staple diets as maize. Not only are the non-European patients likely to have been living on a deficient diet before they seek medical aid because of disease, but the important part of their treatment must obviously include a programme aimed at restoring an adequate nutritional status.

The so-called normal diet of the Native population includes mealie meal as a standard article. Although mealie meal may contain 10% of protein, it lacks lysine and tryptophane, to mention but two important amino acids. It is obvious that adequate restoration of protein intake is important in the treatment of such patients.

It is useful and important to know that palatable and inexpensive protein concentrates are available to-day in forms which make it possible to contemplate an energetic attack upon the problem of maintaining optimal health as well as treating disease. These simple and cheap forms of protein are now available for private as well as institutional practice. Protein is also prepared in the form of drinks which make it easier to persuade the sick and the convalescent to take adequate supplies of their requirements.

Early interest in the problems of nutrition led to such exclusive and intensive investigation of the functions of the vitamins, that the equally important role of many other factors was, until recently, overlooked. Side by side with the renewed experimental interest in the role of protein in health and disease there has proceeded an equally energetic development of proteins and their derivatives in forms suitable for practical application to daily medical problems. It is gratifying to know that South Africa has not lagged behind in making its contribution to this important work. As a result of the industry of manufacturers in this country, we now have available useful, palatable and inexpensive preparations of protein for maintaining the health of the population under all kinds of conditions.

Hierdie metode van die waardeverhoging van diëet kan verreikende gevolge hê indien dit toegepas word op voedingsvraagstukke in 'n land soos Suid-Afrika met sy groot natuurlebevolking wat aan ondervoeding ly en van so 'n ontoereikende hoofdiëet soos mielies moet lewe. Nie-blanke pasiënte wat mediese hulp soek weens siekte, het heelwaarskynlik van 'n gebrekkige diëet moes lewe en 'n belangrike deel van hulle behandeling moet vanselfsprekend 'n program insluit wat die herstel van 'n toereikende voedingstatus ten doel het.

Die sogenoemde normale diëet van die natuurlebevolking sluit meliemeel as 'n standaard-item in. Hoewel meliemeel 10% proteïen mag bevat, bevat dit geen lisien of triptofaan nie, om maar net twee belangrike aminosure te noem. Dit spreek vanself dat toereikende herstel van proteïen-opname belangrik is by die behandeling van sulke pasiënte.

Dit is nuttig en belangrik om te weet dat smaaklike en goedkoop proteïenpitkos tans beskikbaar is in vorms wat dit moontlik maak dat die vraagstuk van die handhawing van die beste gesondheid sowel as die behandeling van siekte kragdadiglik aangepak kan word. Hierdie eenvoudige en goedkoop vorms van proteïen is tans vir private praktyk sowel as vir hospitale beskikbaar. Proteïen word ook in die vorm van 'n drank berei wat dit makliker maak om siekes en herstellendes te bewoeg om genoegsame voorrade van hulle behoeftes in te neem.

Vroeë belangstelling in voedingsvraagstukke het aanleiding gegee tot so 'n uitsluitende en intensiewe ondersoek van die funksies van die vitamien dat die ewe belangrike rol wat baie ander faktore speel tot onlangs oor die hoof gesien is. Gepaard met die hernude proefondervindelike belangstelling in die rol wat proteïen in gesondheid en siekte speel, het daar net so 'n energieke ontwikkeling plaasgevind van proteïene en derivate daarvan in vorms wat hulle leen tot praktiese toepassing op daaglikse geneeskundige probleme. Die wete dat Suid-Afrika nie agtergebly het nie maar sy bydrae tot hierdie belangrike werk gelewer het, stem tot tevredenheid. As gevolg van die ywer van vervaardigers in hierdie land het ons tans nuttige, smaaklike en goedkoop preparate van proteïen tot ons beskikking vir die handhawing van die volk se gesondheid in alle soorte toestande.

## THE AMINO ACID REQUIREMENTS OF MAN

F. W. Fox, D.Sc.

*South African Institute for Medical Research, Johannesburg*

The term 'protein' was selected by the Dutch chemist Mulder in 1839 because he considered these substances 'to be of first importance'. By the early years of this century the role of the proteins was being actively investigated and the significance of the amino acids present in a given protein was gradually becoming clear. This is readily seen from the papers published by

prominent investigators such as Osborne, Mendel and others. Curiously enough, it was the type of experiment then being conducted, in which animals were fed on highly purified proteins, that led to the discovery of the vitamins and, by opening up an entirely new field, had the result that further work on the nutritive value of the proteins was almost completely abandoned.

Whilst pre-occupation with the vitamins has no doubt been somewhat unfortunate, it has now become possible to re-open the subject on a much more satisfactory basis, since diets now known to be adequate in many other if not all respects, can be tested for their adequacy in amino acids—formerly an impossible task.

Nevertheless a few investigators continued to work on protein and amino acid problems in relation to nutrition. The name of Rose is outstanding in this field. A distinguished pupil of Mendel, he has relentlessly pursued the difficult task of determining which of the various amino acids present in our commoner foodstuffs play an essential role in the nutrition of the animal body and which the animal can synthesize for itself. Other workers have been engaged on similar or allied studies, yet it must be admitted that the technical problems encountered have as yet only been partially solved. Thus even the amino acid composition of our best known food proteins rests on a few analyses which differ amongst themselves, especially for certain values, whilst foodstuffs of great interest to the nutritionist still remain to be studied.

However, all the work done so far emphasizes the extreme importance of protein to the living organism. Not only do all living things contain proteins in their cellular protoplasm, cell walls and nuclear material, but such fundamental substances as the enzymes, some of the vitamins and the hormones are either proteins or closely related to them. Just as proteins are the structural units of the body tissues, so the amino acids are the building stones of the proteins.

For the sake of brevity we will confine ourselves mainly to the work of Rose and his colleagues. In 1935 they made a notable advance. Rats were fed on diets in which the nitrogen requirements were met solely from adequate supplies of the amino acids then known to occur in foodstuffs; but they failed to grow. It was discovered that isoleucine and a new amino acid, which was named threonine, had to be added to the diet. When this was done the animals not only remained in nitrogen equilibrium, but grew in a normal manner. Having found by further experiments that there were 10 amino acids essential for the rearing of rats, progress became faster, though still tedious and full of technical difficulties.

By 1942 Rose was ready to begin similar studies on man, which he has continued ever since. Painstaking work was required and many subjects had to be investigated, but quite recently (Rose, 1949) he has published what he describes as his tentative findings on the qualitative and quantitative requirements for the amino acids by adult males. This paper surely marks a new and most important advance in our understanding of the protein component of human diets. In what follows we propose to offer a brief summary of the knowledge now available on this subject in the light of Rose's work. To do this we must first be clear about the limitations, as well as the significance of the contribution made by this paper.

Rose's experimental subjects were male graduate students who were fed on a very carefully devised diet adequate in all known respects but from which protein had been rigidly excluded; (nitrogen intake 0.30-0.35

gm. daily). To this diet was added a mixture of the pure amino acids considered to be essential, with the exception of the one under test. The amount of this single component was then adjusted in successive experiments until nitrogen equilibrium was attained and maintained. Having in this way determined the requirements for a given amino acid, Rose included this amount and the next on the list was tested out in a similar manner. His principal findings are summarized in Table I.

TABLE I

Minimum and recommended intake of the amino acids found essential for the normal adult male when the diet furnishes sufficient nitrogen for synthesis of non-essentials (Rose, 1949; Strictly Tentative Values)

Amino Acid	Number of Subjects Tested	Minimum Daily Requirement	Recommended Daily Intake
L-Tryptophane ..	31*	0.25	0.5
L-Phenylalanine ..	22	1.10	2.2
L-Lysine ..	27	0.80	1.6
L-Threonine ..	19	0.50	1.0
L-Valine ..	23	0.80	1.6
L-Methionine ..	13	1.10	2.2
L-Leucine ..	8	1.10	2.2
L-Isoleucine ..	8	0.70	1.4

\*All of these subjects have been kept in balance on 0.3 gm. or less.

Amino acids not found to be essential to maintain nitrogen balance: alanine, arginine, aspartic acid, citrulline, cystine, glutamic acid, glycine, histidine, hydroxy-proline, serine, tyrosine.

The following comments may be made on the above findings:—

i. The immense amount of work required to establish these estimates may be judged by the fact that no less than 31 subjects were employed on the tryptophane-deficient diet alone. Incidentally, the expensive nature of such diets containing large amounts of highly purified amino acids will be appreciated. As the requirements for successive amino acids were settled it became possible to determine the remainder by testing a smaller number of subjects.

ii. Rose insists that his findings must still be regarded as tentative. In any case they only apply to adult males. It is clear that much further work will be required to determine the requirements of the growing child and for periods of nutritional stress, such as reproduction and lactation. Furthermore, the requirements during detoxication, disease and convalescence may be very different, depending upon the nature and severity of the condition.

iii. It will be seen that the recommended daily intake is twice the minimum requirement, i.e. the usual margin of safety has been allowed.

iv. The requirements for individuals varied by as much as 100% for some amino acids and hardly at all for others. This may mean that partial synthesis may be possible in some cases. The highest requirement found was always taken as the base line; thus in some subjects the minimum requirement for tryptophane was as low as 0.15 gm.

v. It may be well to comment on the term 'essential' which is in common use when referring to those amino



acids which the body cannot synthesize. This term is unfortunate in so far as it suggests that those which can be synthesized—often in large amounts, e.g. glycine, are of lesser importance to the body. This is not necessarily true. As remarked by Quick, it would be as logical to say that, because the rat can synthesize ascorbic acid, this vitamin is of less importance to this animal than it is to the guinea-pig. What is meant is that it is essential that these particular amino acids should be provided by the diet. Some investigators prefer the words 'indispensable' and 'dispensable'.

vi. Though the non-essential amino acids can be synthesized by the body, this can only be accomplished provided there is an adequate supply of suitable nitrogen-containing raw material. Rose found that urea or glycine could be used for this purpose by adult males and he took good care to include sufficient of one or other of these substances to provide 10 gm. of nitrogen daily.

vii. Hence the experimental subjects were required to synthesize the whole of their amino acid requirements other than the eight supplied to them in the diet. This raises the question whether the minimum amounts found necessary were influenced by the necessity for so much synthetic activity that would not normally be required. For instance, it is known that cystine when present has a 'sparing' effect upon the requirements for methionine. Rose intends to investigate this point, as also the probability that tyrosine may 'spare' phenylalanine.

viii. The possibility that alimentary organisms in a more normal diet would synthesize certain amino acids, which could then be utilized, cannot altogether be excluded and may be mentioned if only to indicate the many problems that have to be faced in this type of work.

ix. Rose has thus demonstrated that the amino acids required by adult men for the maintenance of nitrogen equilibrium are identical with those previously found necessary for the maximum growth of the rat, except in the case of arginine and histidine. It was already known that the *adult* rat and the *adult* dog could synthesize sufficient arginine to meet their requirements. Rose does not, however, comment on the findings of Albanese and his colleagues that arginine in the diet is needed by men for the production of sperms. That the human adult male can dispense with histidine came as a surprise, but was confirmed on no less than 42 individuals.

x. As might be expected these experiments, carried out so carefully, have brought fresh problems to light. Thus it was found necessary to maintain the calorie intake at a higher level than was expected; otherwise nitrogen equilibrium was not assured. Perhaps proteins contain some constituent, or 'contaminant', which promotes the efficient utilization of food energy or of the amino acids, and which is destroyed during the hydrolysis required for the preparation of the pure substances employed in the diet.

Much still remains to be done before the qualitative and quantitative requirements for the amino acids of men, women and children, both in health and disease can be fully established; but we now have a solid founda-

tion on which to work. Thus at least for the healthy adult male we need no longer use the old empirical standard of '70 gm. of protein daily', but must try to provide at least the recommended allowances for the eight amino acids known to be essential. In Table II the structural formulae of these substances are given, together with that of glycine, which is the simplest of the amino acids, and thus serves as the prototype. It is interesting to note that no less than five of these all-important dietary constituents are simple organic compounds which one would have thought the body could have synthesized.

TABLE II

## AMINO ACIDS ESSENTIAL FOR ADULT MALES

GLYCINE	$\text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH}$ PARENT ACID. NOT ESSENTIAL
VALINE	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH} - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{CH}_3 \end{array}$
LEUCINE	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH} - \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{CH}_3 \end{array}$
ISO-LEUCINE	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH} - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{CH}_2 - \text{CH}_3 \end{array}$
THREONINE	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH} - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{OH} \end{array}$
LYSINE	$\begin{array}{c} \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \end{array}$
PHENYLALANINE	$\begin{array}{c} \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{O} \end{array}$
TRYPTOPHANE	$\begin{array}{c} \text{O} \\   \\ \text{C} - \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{NH} \end{array}$
METHIONINE	$\text{CH}_3 - \text{S} - \text{CH}_2 - \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH}$
CYSTINE	$\begin{array}{c} \text{S} - \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \\   \\ \text{S} - \text{CH}_2 - \text{CH} (\text{NH}_2) - \text{COOH} \end{array}$ ↓ CONVERTED SLOWLY INTO

What we need to know next is the amino acid make-up of the commoner proteins available for dietary purposes. In Table III some typical analyses have been assembled from which it is possible to compare the amount of a given essential amino acid in one class of protein with that of another class. As already mentioned, such analytical data are as yet very scanty, nor are the values for each amino acid that have been included of equal accuracy. Better methods of analysis and far more analyses are indeed badly needed. But if these limitations are kept in mind the values given are very informative, even if they must be regarded as

TABLE III

Approximate percentage of the amino acids essential for man in some of the commoner edible proteins.  
(Adapted from various sources, especially Block and Bolling, 1945 : Calculated to 16 gm. nitrogen)

## A. Proteins of Vegetable Origin

Amino Acid	Whole Cereal				Germ		Endosperm	
	Maize	Wheat	Rice	Oat	Maize	Wheat	Maize	Wheat
Lysine .. .. .	2.0	2.7	3.2	3.3	5.8	6.4	1.1	1.9
Tryptophane .. .. .	0.8	1.2	1.3	1.3	1.3	1.0	0.6	1.0
Phenylalanine .. .. .	5.0	5.7	6.3	6.9	5.6	4.2	6.6	5.5
Methionine .. .. .	4.0	2.0	3.4	2.3	2.3	2.0	5.5	3.0
(Cystine) .. .. .	1.1	1.3	1.4	1.8	1.2	0.6	1.2	1.8
Threonine .. .. .	3.6	3.3	3.9	3.5	4.4	3.8	4.0	2.6
Leucine .. .. .	21.5	5.8	9.0	8.0	6.7	7.4	25.0	12.0
Isoleucine .. .. .	3.6	3.3	5.1	5.3	3.7	3.0	5.0	4.0
Valine .. .. .	4.6	3.6	6.3	6.5	5.8	4.1	5.0	3.0

TABLE III (Continued)

Amino Acid	Prolamin or Gliadin		Soybean Meal	Peanut Meal	Food Yeast	Leaves	Leafy Vegetables
	Zein (maize)	Gliadin (wheat)					
Lysine .. .. .	0.0	0.7	5.8	3.0	8.0	5.0	5.7
Tryptophane .. .. .	0.1	0.8	1.6	1.0	1.2	2.1	1.9
Phenylalanine .. .. .	6.4	—	5.7	5.4	2.9	4.5	4.5
Methionine .. .. .	2.0	2.1	2.0, 3.6	1.3, 3.4	2.8	2.3	2.3
(Cystine) .. .. .	0.8	2.1	0.6	1.6	1.1	1.8	2.0
Threonine .. .. .	2.4	2.7	4.0	1.5	5.1	4.8	4.1
Leucine .. .. .	23.7	6.1	6.6	5.5, 10	6.8	11.0	—
Isoleucine .. .. .	4.3	—	4.7	3.4	5.8	5.4	—
Valine .. .. .	2.4	—	4.2	—	5.4	6.0	—

TABLE III (Continued)

## B. Proteins of Animal Origin

Amino Acid	Whole Egg	Cow's Milk	Human Milk	Liver	Animal Muscle	Fish Muscle	Serum Protein	Haemoglobins	Casein	Gelatin
Lysine .. .. .	7.2	7.5	7.2	6.3	7.6	7.8	8.0	9.0	6.9	5.0
Tryptophane .. .. .	1.5	1.6	1.5-3.1	1.5	1.2	1.3	1.7	3.4	1.8	0.0
Phenylalanine .. .. .	6.3	5.7	5.9	7.3	4.5	4.8	5.4	7.0	5.2	2.5
Methionine .. .. .	4.1	3.7	2.5	3.2	3.2	3.2	1.9	0.5-1.8	3.5	0.8
(Cystine) .. .. .	2.4	0.7	2.3-3.9	1.4	1.1	1.2	3.6	0.4-1.8	0.4	0.1
Threonine .. .. .	4.9	4.6	4.5	5.8	5.3	5.1	6.3	6.8	3.9	1.5
Leucine .. .. .	9.2	11.3	10.1	8.4	8.0	7.1	18.0	16.6	12.1	3.7
Isoleucine .. .. .	8.0	6.2	7.5	5.6	6.3	6.0	3.0	1.5	6.5	1.7
Valine .. .. .	7.3	6.6	8.8	6.2	5.8	5.8	6.0	8.2	7.0	2.5

preliminary estimates. It is also essential to be clear that what is being compared is the percentage of each amino acid present in the protein itself and *not* in the same weight of foodstuff. Unless this is appreciated such figures can give rise to serious misunderstanding. For instance, the proteins of cow's milk and soya bean meal contain the same proportion of tryptophane; yet 100 ml. of the former only contains 3.5% of protein, whereas the latter contains as much as 30-40%. Hence the same weight of soya bean meal contains far more tryptophane than does cow's milk.

## COMMENTS ON TABLE III

The following general remarks are based on the values for the essential amino acids given in the Table together with similar information about the other members of this group which are present, but which have been omitted for the sake of simplicity.

**Cereals.** Rice and oat proteins are superior to those of maize and wheat. The proteins of whole grains are superior to those of the endosperm owing to the relatively high-quality amino acids present in the germ



proteins. It will be seen that maize protein, though poorer in tryptophane and possibly phenylalanine, is actually richer in methionine and valine and much richer in leucine than the protein of wheat. Lysine deficiency is the salient lack in all cereals.

In view of the importance of maize protein in this country, it may be well to enlarge slightly on the above remarks. Ever since the classical experiments of Osborne and Mendel on one of the proteins present in maize (zein) this foodstuff has been regarded by most people as of a very inferior nutritional value. Writing in this *Journal* in 1934 we drew attention to this unfortunate but natural misunderstanding of the work of Osborne and Mendel, but the view persists. The figures now given in Table IV should make the true position clear. It may also be worth quoting the following considered opinion of Bolling, who writes: 'One fact is clearly brought out, namely, that both corn and wheat germ proteins are well balanced with respect to their essential amino acids and compare favourably with the common proteins of animal origin.'

These facts should bring home to us not only the importance of retaining the germ in maize meal and the inferior nutritional value of maize fractions such as samp and highly refined mealie meal, but also the valuable nature of maize germ, which is so neglected as a food for man.

**Legumes.** Soya bean proteins are well balanced in all respects except for a slight deficiency in methionine. This lack could be corrected by the inclusion of whole maize or maize gluten in the diet, or possibly by the addition of a small quantity of cystine, as the lecithin present in whole soybeans should supply an ample quantity of methyl groups in the form of choline, thus eliminating the need for the more expensive methionine.

**Peanuts.** The deficiency of methionine has been known for some years, but the comparatively small amount of threonine present must also be noted.

**Yeasts.** These vary according to the type analysed, but the general similarity to casein will be observed. Together with soya bean the yeasts offer interesting possibilities as a vegetable substitute for animal protein.

**Leaves and Leafy Vegetables.** The values obtained for a wide range of leafy vegetables were found to be so similar that they were averaged to give the figures included in the table. Protein from such sources is well balanced and indeed rich in some of the essential amino acids. Unfortunately the amount of protein present is seldom more than 2% and often less. Hence the protein intake from this source is usually very low. However the Bantu often eat quite appreciable amounts in the form of wild leaves or 'spinach', so that the amino acids contributed in this way may be of significance. Moreover, since green leaves are cheap, we may have here a source of essential acids that could be concentrated for nutritional ends.

**Eggs.** Animal experiments have proved the high biological value of egg protein and this is borne out by the amino acid analyses both of whole egg, yolk and egg white. Indeed whole egg protein is now being accepted as the standard against which other proteins—even those of milk and meat—are compared.

**Milk.** The proteins both of cow's milk and human milk are excellently balanced and known to be of high biological value. The nutritive superiority of human as compared with cow's milk protein is rather generally accepted by paediatricians and may perhaps be accounted for by the differences shown in Table III.

**Meat.** It is somewhat surprising to find that there are not any marked differences between the amino acid make-up of animal and fish proteins. Moreover the muscle proteins of beef, mutton, pork, etc., are so similar that they have not been listed separately. Nor is the difference between the glandular organs, such as the liver, as marked as would have been expected. However there are definite differences between the proteins of meat and egg. Thus meat yields slightly more lysine, slightly more tryptophane and much less cystine than egg. Compared with cow's milk, meat is a superior source of threonine and cystine, but contains less tryptophane, phenylalanine, valine and specially leucine.

**Serum and Blood Pigment Proteins.** These figures have been included because there are occasions, e.g. after severe haemorrhage, when the body may be called upon to synthesize considerable amounts fairly quickly, along with the proteins of the blood pigments. The high lysine content will be noticed.

**Fruits.** These contain negligible amounts of protein. Indeed, with the single exception of the coconut, the figure for 'crude protein' does not exceed 1% and is often much lower; moreover, the nitrogen estimated on analysis is not necessarily present in the form of protein.

#### COMPARISON OF A 'GOOD' AND A 'POOR' PROTEIN

A clearer picture of the difference in amino acid composition of a typical 'good' protein such as casein (or egg protein) and a 'poor' protein such as gelatin, may be gained by studying the last two columns of the Table III. Gelatin is a poor source of all the essential amino acids and contains only a trace of cystine and no tryptophane. (It may be mentioned, however, that it is amply supplied with arginine and is a rich source of glycine.)

The principal essential amino acids likely to be deficient in a typical diet are lysine, tryptophane, methionine (and cystine). Taking whole egg protein as his standard, Mitchell calculated the percentage deficiency of methionine-cystine in certain foods to be as follows: beef muscle 29; cow's milk 32; human milk 46; soybean 40; peanut 76; leafy vegetables 44.

Whilst comparisons of the proteins present in our foods are necessary if we are to understand their relative value in terms of the various amino acids, they do not provide us immediately with the practical information required by the dietician. For this purpose we must calculate the amount of each amino acid present in some convenient unit of the foodstuff that is under consideration.

This has been done for a few foodstuffs in Table IV. Until the amino acid analyses of foods become more numerous and more accurate, and until we know more about daily requirements, it may be a little premature to push this practical aspect very far. But it will be

TABLE IV

Approximate quantities of nitrogen and the essential amino acids furnished by 100 gm. of some common foodstuffs (gm.).

	Whole Maize Meal	Whole Wheat Meal	White Flour	Soya Bean Meal	Whole Cow's Milk	Fresh Meat	Daily Require- ments*
Nitrogen .. .. .	1.60	1.90	2.10	7.60	0.58	3.20	—
Lysine .. .. .	0.25	0.32	0.25	2.57	0.27	1.60	1.6
Tryptophane .. .. .	0.07	0.10	0.11	0.71	0.06	1.26	0.5
Phenylalanine .. .. .	0.45	0.68	0.72	2.57	0.21	0.95	2.2
Methionine .. .. .	0.50	—	0.40	0.95	0.10	0.64	2.2
(Cystine) .. .. .	0.11	0.19	0.25	0.48	0.04	0.22	—
Threonine .. .. .	0.36	0.39	0.35	1.90	0.17	0.83	1.0
Leucine .. .. .	2.20	1.50	1.60	3.5	0.60	2.40	2.2
Isoleucine .. .. .	0.36	0.58	0.49	1.9	0.16	0.70	1.4
Valine .. .. .	0.46	0.58	0.45	2.2	0.16	0.70	1.6

\*See Table I.

Note: These values are for the uncooked food and make no allowance for losses during digestion or assimilation.

seen that a far more satisfactory basis for the rational planning of the protein constituent of a given dietary is soon likely to be available. Not only will there be a clearer insight into the amino acid deficiencies likely to occur with a given mixture of proteins, but new possibilities for correcting such deficiencies are being opened up. Thus the well-known principle of combining various proteins because of their presumed supplementary properties will become much more precise. Again, it should become possible to obtain cheap supplies of such an amino acid as lysine, e.g. without recourse to expensive animal products. To quote Block: 'The addition of small amounts of lysine to whole wheat or to white flour will more than double their nutritive and biological value, converting them from inferior protein foods to foods having a nutritive value almost as good as many of the more expensive animal protein foods.' Thus ways may be found for overcoming one of the main difficulties that beset the practical dietician, viz. that even the inferior diets which are so commonly consumed, partly for economic reasons but also very often because they have the sanctions of custom or habit, may be made nutritionally more satisfactory (*vide* Odendaal, 1949).

As yet only a small beginning has been made with the elucidation of the 'amino acid deficiency diseases', but here is another field likely to yield valuable and possibly very unexpected results.

In Table V we have included an interesting table prepared by Block which compares the daily intake of the eight essential amino acids as determined by Rose with the average amounts actually entering into consumption in the United States. It should be noted that these are maximum figures, since presumably no allowance has been made for loss due to waste after purchase, indigestibility of protein, etc. Taken as they stand, it appears that the amounts of most of the amino acids available were at least double those recommended by Rose, and it must be remembered that he had already allowed a margin of safety of 100%. However, this was not a population composed solely of adult

TABLE V

Estimated average daily per capita consumption of the essential amino acids in the United States: 1937—1941.

(Adapted from Block and Bolling, 1945)

Weight of foodstuffs consumed .. ..	1.9 lb.
Expressed as protein .. ..	89.0 gm.
Expressed as nitrogen .. ..	14.2 gm.

Essential amino acids	Gm.	Daily Requirements*
Lysine .. .. .	5.2	1.6
Tryptophane .. .. .	1.1	0.5
Phenylalanine .. .. .	4.7	2.2
Methionine .. .. .	2.9	2.2
(Cystine) .. .. .	1.2	—
Threonine .. .. .	3.6	1.0
Leucine .. .. .	12.6	2.2
Isoleucine .. .. .	3.7	1.4
Valine .. .. .	3.9	1.6

\*See Table I. Whilst the daily requirements refer to the adult male the amounts available were consumed by men, women and children, both in health and in sickness.

males, but included large numbers of growing children, pregnant and lactating women, as well as many persons who were diseased. Moreover, the margin for at least one amino acid, namely methionine, was not very great.

In preparing this brief summary we have deliberately ignored such aspects as the effect of heating, palatability, the losses owing to indigestibility, etc., which all have a bearing upon our amino acid requirements. We have drawn heavily on the writings of Block, Bolling, Rose, etc., but it seemed unnecessary to indicate this fact by constant references in the text.

## REFERENCES

- Various articles by R. J. Block and D. Bolling, more especially *The Amino Acid Composition of Proteins and Foods* Springfield, 1945.  
Odendaal, W. A. (1949): Clin. Proc., 8, 163.  
Rose W. A. (1949): Federation Proceed., 8, 546.

## QUESTIONS ANSWERED

### THYROTOXICOSIS AND NEURASTHENIA

**Q.** I should be glad of advice on the best treatment to adopt for the following type of case: The patient is a young female, 18-20 years of age.

**Complaints:** Tiredness, nervousness, gets upset easily, sometimes sleeplessness. **On examination** there was very slight enlargement of the thyroid. Tachycardia may or may not be present. There is usually a slight tremor and a tendency to weep on the slightest provocation. There are no other signs of thyrotoxicosis. For financial reasons a long rest and change is not possible. What is one to do?

**A.** The symptoms in this patient are not specific for thyrotoxicosis. They are, however, very common in neurasthenia, which is a diagnosis covering a multitude of conditions.

Slight enlargement of the thyroid is quite common in women and there are no reasons in this patient, given in the history, to show that the thyroid is overactive.

Anxiety states are common, and it is suggested that she be investigated from the point of view of the psychiatrist. In the meanwhile, phenobarbitone gr. 1 twice a day, a good diet, and the advice of a psychiatrist are all that can be suggested.

## PASSING EVENTS

Dr. Morris Witkin has returned to Johannesburg from overseas. He devoted eight months to post-graduate work in various hospitals in England.

### DINNER IN HONOUR OF DR. FRANK BESTER, PAARL

Those who inadvertently did not receive an invitation to the dinner in honour of Dr. Frank Bester, of Paarl, should inform Dr. H. M. Griffiths, 1 Main Road, Rondebosch, C.P., if they wish to be present. A hearty welcome awaits them.

## REVIEWS OF BOOKS

### DESIGN AND EQUIPMENT OF HOSPITALS

*The Design and Equipment of Hospitals.* By Ronald Ward, F.R.I.B.A., F.I.Arb., M.R.San.I. (Pp. 360 + xvi. With 177 illustrations. 42s.) Baillière, Tindall & Cox. London: 1949.

**Contents:** 1. Introductory. 2. General Considerations. 3. Administrative Considerations. 4. Medical Considerations. 5. Special Wards. 6. Special Hospitals. 7. Construction. Conclusion; Bibliography; Index.

This book has been published at a time when hospital construction is being resumed after the lapse of the war years. It provides an index for medical practitioners and hospital administrators to formulate their requirements for any future project and to enable them to incorporate the latest advances in hospital design.

The list of contents gives an indication of the wide field it attempts to cover. This it fails to do. No matter how capable the author, any book on this subject must necessarily be inadequate if it is to be useful to both professions. It is in some instances unnecessarily technical for the medical profession and yet is not a comprehensive technical survey of current hospital practice for the architect. This book does, however, partially fill a gap in hospital literature left by the war years, and as such should be of considerable use to all those connected with the planning of new hospital projects in the principles of design and equipment.

Each section gives detailed information about general and detailed planning requirement, finishes, colours, sizes, etc., with numerous plans and photographs to illustrate the text. The illustrations depict many of the better examples of pre-war work, although it is a pity that none of the work done in Europe and America after the war has been included. Also it is unfortunate that no example of temporary pre-fabricated hospitals has been included, as this type of structure is

important at the moment to alleviate the pressing problem of rural lack of hospitalization.

For anyone seeking information in the more specialized fields of isolation, tuberculosis, chronic and eye hospitals, this book will give only a very rudimentary collection of information and more detailed works will have to be consulted.

The general format of the book is pleasing, the type being large and easy to read. The photographs and plans are well reproduced.

### MENTAL LIFE OF CHILDREN

*The Mental Life of the Child.* By Gustav Hans Graber, Dr. Phil. (Bern). (Pp. 158. 8s. 6d.) London: Staples Press Ltd. 1st ed. 1949.

**Contents:** Introduction.

Part I. *The Child's Being and Upbringing.*

Part II. *Extracts from the Practice of Deep Psychological Analysis in Childhood.* 1. Transformation of Aggression. 2. Relief of Fear. 3. Sexual Need and Enlightenment. 4. Dream Interpretation, Solution of Complexes, Transformation of Character.

This book is addressed to 'all preceptors, parents (especially mothers), teachers, priests, physicians, psychologists and also to students'. However, it would convey little to most of these, unless they were familiar with psycho-analytical terminology, as these examples illustrate: 'Our true soul is the embryonic unconscious. To distinguish it from the ego, a post-natal acquisition, I call it the Self. It is, and remains all our lives, our unalterable and most precious treasure.'

'The newly born child rejects the unfriendly outer world, and later wishes to destroy it. Apparently the only way to do this is by incorporation. The end of the world thus means a return of the world to the state of the embryo, it means its submersion, in means reunion, which is the ideal state for the world and for the child. Destruction thus means devouring, and devouring is submersion (in the amniotic fluid or in the primal sea).'

The book is divided into two sections. The first part deals with the author's philosophical and practical conception of the child's subconscious and its development. The second part details the manner in which the author has handled some behaviour problems of children by dream interpretations. He has apparently been very successful with the cases on which he reports—children whose dreams he made use of for diagnosis and therapy.

The most difficult cases in paediatric practice are behaviour problems. Few practitioners have sufficient understanding and knowledge to help any but simple cases. It is with the less simple cases that psychotherapy comes in. Unfortunately, this is still a relatively young science and a great deal of the claims made for it are unsubstantiated.

It would have been interesting if the author had included his failures; one could then have assessed the value of this treatment.

### ESSENTIALS OF CHIROPODY

*The Essentials of Chiropractic.* By Charles A. Pratt. (Pp. 156 + xii. With 34 illustrations. 10s. 6d.) London: H. K. Lewis & Co. Ltd. 2nd ed. 1949.

**Contents:** 1. Introduction. 2. The Bones of the Leg and Foot. 3. The Joints of the Foot. 4. The Muscles of the Leg and Foot. 5. The Skin and its Appendages. 6. The Structure and Function of the Arches of the Foot. 7. Footwear. 8. The Principles of Treatment. 9. Foot Hygiene. 10. The essential Requirements for Practising Chiropractic. 11. Inflammation. 12. Blisters, Abrasions and Wounds. 13. Flat Feet. 14. Deformities of the Toes. Hallux Valgus. 15. Deformities of the Toes. Hallux Rigidus, Hammer, Elevated and Claw Toes. 16. Disorders of the Nail. 17. Corns and Callusities. 18. Hyperhidrosis and Soft Corns. 19. Miscellaneous Conditions. 20. Foot Inspections. 21. Glossary.

This volume, as the author states in the preface to the first edition, is 'specially written for beginners'.

The style of the text is apt, being that of a sympathetic lecturer; and all technical terms are explained upon introduction. It is, however, unfortunate that one third of this slim volume has been devoted to the anatomy of the lower leg and foot, for such subject matter can be found in numerous regional anatomy textbooks, both elementary and advanced, and could only be discouraging to the new chiropractic student who opens his first introductory textbook.



The text, though helpful, is not consistently so. The sections on the strapping for hallux valgus and hammer toe are excellent, being well conceived and well illustrated; on the other hand, verruca pedis is quite summarily dismissed and the etiology of heloma molle so incomplete as to be misleading.

The volume would certainly not furnish the student with adequate examination requirements or sufficient knowledge to commence practice, as the vague term 'all the information they required' from the preface of the first edition might suggest.

The author passes on much of his experience as a regimental chiropodist, especially in the treatment of incipient onychocryptosis. While he makes an interesting point of the possibilities of co-operation between the manipulator and the chiropodist, he also, wisely, stresses the necessity for co-operation between the medical practitioner and the chiropodist.

#### COLE'S OPERATIVE TECHNIC IN GENERAL SURGERY

*Operative Technic in General Surgery.* Edited by Warren H. Cole, M.D., F.A.C.S. (Pp. 951 + xi. With 521 illustrations. \$30.00.) Appleton-Century-Crofts, Inc. New York. 1949.

*Contents:* Preface; Introduction. 1. Wound Healing and the Care of Wounds. 2. Hemorrhage and Shock. 3. Burns. 4. Preoperative and Postoperative Care. 5. Amputations. 6. The Face, Mouth and Jaws. 7. The Esophagus. 8. Abdominal Incisions. 9. Surgery of Stomach and Duodenum; Gastric Vagotomy in the Treatment of Peptic Ulcer. 10. Surgery of the Small Intestine. 11. The Pancreas and Adrenal. 12. The Gall Bladder and Bile Ducts. 13. The Liver and Subphrenic Space. 14. The Colon and Appendix. 15. The Lower Part of the Sigmoid, the Rectum and Anus. 16. Lymphatic System, Spleen and Portal Hypertension. 17. Abdominal Hernia. 18. The Breast. 19. The Thyroid and parathyroid Glands. 20. The Muscles, Fasciae, Tendons and Bursae. 21. The Blood Vessels. 22. Surgery of the Hand and its Tendons. 23. The Skin and Subcutaneous Tissue. Index.

A new book on operative technique which costs thirty dollars must be very good to justify such a high price in these days of dollar scarcity. The present volume is edited by Warren Cole and includes a distinguished list of contributors. Waltman Walters writes on the surgery of the stomach and duodenum, Dragstedt on vagotomy, Brunschwig on the pancreas and adrenal, Claude Dixon on the sigmoid and rectum, Roscoe Graham on the colon and appendix, Alton Ochsner and de Bakey on the liver and vascular injuries, Pemberton on the thyroid and so on—a galaxy of talent.

The question arises whether the resulting book is worth the money. It is well printed and lavishly illustrated. This goes without saying in an American publication. Does it offer something which other books of the same nature lack? On the whole, yes.

Particularly good are the preliminary chapters on such subjects as wound healing and the care of wounds, haemorrhage and shock, burns and pre-operative and post-operative care. Every textbook on surgery begins with them, nobody ever reads them and yet they are of first importance. Here they are dealt with in sober good sense. The section on burns is outstandingly good. There is an excellent discussion on abdominal incisions by Collier and Maclean who are propagandists for transverse incisions. Conservatism only is responsible for the emphasis on vertical approaches—though Roscoe Graham writes that in Toronto experience with transverse incisions has been unfortunate.

The use of non-absorbable sutures is favoured by all the contributors to this volume. Continental surgeons have used silk in preference to catgut for many years. Recently a vogue for stainless steel sutures has set in. Probably there is not much in the controversy. But surgeons who like to get their patients up early feel safer with the non-absorbable variety.

These are perhaps the trivia which surgeons gossip about in the tea-room between operations. There are weightier topics which must be considered in a textbook on operative surgery. Most of the standard procedures are described clearly with adequate illustrations. The operation for splenectomy with its indications are very good. Obviously a book edited by Warren Cole is bound to devote considerable space to injuries and strictures of the common bile duct. It has always seemed strange to this reviewer that there should be so much pre-

occupation in American journals with reconstruction of the bile duct. In Cape Town, for example, it is the rarest experience to have to deal with this problem. There is only one reason for having to cope with it (bad gall bladder surgery) and one is driven to the conclusion that there must be a great deal of bad gall bladder surgery in the United States.

Waltman Walters handles the section on stomach and duodenum effectively though it is difficult to understand why he finds it necessary to describe Billroth I procedures in gastrectomy—surely no surgeons use the method these days? As for the Balfour ulcer resection combined with gastro-enterostomy, what is there to say about it except to condemn it as a half-witted, time-wasting procedure?

There is far too much space given to amputations. This is a book on general surgery. Many of the illustrations in this section and the descriptive material would be better if they were transferred to an orthopaedic section which presumably will come later in the series.

Claude Dixon's section on the colon and rectum is clear and concise. The value of primary anastomosis without preliminary colostomy in colon and rectal carcinoma is slowly percolating through to the general surgeon and Dixon, as one of the pioneers in this field, must be treated with respect.

It is a pity that the surgery of the sympathetic system is ignored or is it excluded as not coming into the domain of general surgery? There is scarcely a textbook on operative surgery which gives a reasonable description of lumbar sympathectomy, a common enough operation.

Apart from inevitable criticism, in the opinion of this reviewer most general surgeons would be well advised to have this volume on their bookshelves.

#### BRITISH SURGICAL PRACTICE

*British Surgical Practice.* Vol. V. Edited by Sir Ernest Rock Carling, F.R.C.S., F.R.C.P. and J. Paterson Ross, M.S., F.R.C.S. (Pp. 494 + xxvii, with 220 illustrations and plates. 66s. Only sold in the complete set.) Durban: Butterworth & Co. (Africa), Ltd. 1948.

*Contents:* 1. Hodgkin's Disease, other Reticuloses, Reticulo-Sarcoma and Myelomatosis. 2. Hormones. 3. Hydatid Disease. 4. Hyperhidrosis and Allied States. 5. Hyperpiesia. 6. Immersion Foot. 7. Impotence. 8. Infection, Infections and Inflammation. 9. Injury—Civil and Industrial. 10. Injury—Compression. 11. Intestines. 12. Intussusception. 13. Ischaemia. 14. Jaundice. 15. Joints—Arthrography. 16. Joints—Caisson Disease of. 17. Joints—Injuries and Acute Infections. 18. Joints—Internal Derangements of the Knee. 19. Joints—Tuberculosis. 20. Kidney and Ureter—Cysts. 21. Kidney and Ureter—Denervation of the Kidney. 22. Kidney and Ureter—Growths. 23. Kidney and Ureter—Hydronephrosis and Pyonephrosis. 24. Kidney and Ureter—Stone. 25. Kidney and Ureter—Tuberculosis. 26. Lacrimal Apparatus—Injuries and Diseases. 27. Larynx—Direct Laryngoscopy and Aspiration Treatment in Laryngeal Diphtheria. 28. Larynx—Surgical Diseases of. 29. Law in Relation to Surgery. 30. Lens—Diseases and Injuries. 31. Leprosy. 32. Ligatures and Sutures. 33. Limbs—Absence of. 34. Lipoid Metabolism and Lipoid Granuloma. 35. Liver—Cirrhosis. 36. Lumbar Puncture. 37. Lung—Tumours. 38. Lupus Vulgaris. 39. Lymphogranuloma Inguinale. Index.

The fifth volume in the series *British Surgical Practice* begins with Hodgskin's disease and ends with lymphogranuloma inguinale. As in the other volumes, the subjects are listed in alphabetical order and cover a very large field. A review of the volume as a whole is therefore very difficult, but certain of the outstanding features will be commented upon.

Several chapters deal with subjects which, strictly speaking, do not fall within the scope of the general surgeon, e.g., subjects dealing with conditions of the eye, the larynx and, to a lesser extent, those chapters dealing with joints and the urino-genital apparatus. Nevertheless, the inclusion of these very chapters adds to the completeness of the series and its value as a reference library.

Among the five chapters on joints there is an excellent account of internal derangements of the knee by the late Prof. T. P. MacMurray, and an equally good account of joint tuberculosis by N. W. Nisbet. The treatment of lesions of the cartilage is dealt with at length, both the operative and

post-operative management being adequately described. Joint tuberculosis is described in detail and the inclusion of numerous illustrations adds to the value of this chapter.

Yet another chapter on joint injuries and infections will prove of great value to those who are not frequently confronted with these conditions, and although the descriptions are rather brief, they are nevertheless adequate.

The chapters on the kidney and ureter maintain the high standard. Mr. David Band deals with tuberculosis of the kidney. He warns that tuberculosis bacilluria always means a tubercular lesion of the cortex—often microscopic—from which healing in sanatorium patients may occur in about a fifth of the cases. The kidney never 'secretes' tuberculous bacilli. Prof. W. E. Underwood in his chapters on hydro- and pyonephrosis emphasises the great importance of pain as the earliest symptom. He stresses the early recognition of hydronephrosis and the rigid selection of cases suitable for conservative treatment by demonstrating that the renal pelvis musculature is still contractile. Such selected cases may respond well to peri-arterial sympathectomy of the renal arteries. This subject is dealt with more fully by J. B. Oldham in another chapter. The chapter on renal cysts by Morson makes interesting reading, but it is strange to find under this heading the only reference to the unilateral pyelonephritic kidney, the removal of which sometimes exerts a beneficial effect on hypertension. Other chapters deal with stone and growths.

In his chapter on hydatid disease, Professor Dew gives an excellent account of this condition, which is only too common in South Africa. He emphasizes hepatic and pulmonary infestation, dealing with both complicated and uncomplicated cysts. It is interesting to note that he regards intrabiliary rupture as one of the commonest complications of hepatic hydatids—an observation which is in agreement with our observations in this country; similarly, his remarks about the absence of daughter cysts in pulmonary hydatids. In a chapter on hyperhidrosis and allied states, Dickson Wright discusses the various causes of excessive sweating and the effect of sympathectomy on these conditions. He prefers the anterior approach to the upper thoracic ganglia, but advises against the removal of the stellate ganglion—a procedure which is now again coming into favour in this country.

Professor Learmonth deals with the surgical aspects of hypertension, giving a brief description of the Smithwick operation. He fails, however, to stress the importance of removing the chain as high as at least the third thoracic ganglion, but deals adequately with operative technique and the post-operative care and complications.

Two chapters dealing with injuries will prove of particular value to surgeons employed in industrial areas, the chapter on crush injury by Bywaters being of particular value.

Professor Aird contributes an excellent chapter on intestinal obstruction and deals with all aspects of this very common and important surgical condition. The specimen fluid balance chart which is included and his remarks on this subject should be carefully studied by all practising surgeons. Professor Aird also deals with tumours and tuberculosis of the small intestine, Crohn's disease and congenital atresia. These subjects are not only dealt with in a masterly manner, but numerous excellent references to the literature are quoted.

The chapter on intussusception by G. S. MacNab makes interesting reading. He favours Woodhall's modified double enterostomy operation for irreducible intussusception.

The chapter on jaundice is rather brief but nevertheless deals with the common conditions of this symptom. Professor Illingworth stresses that in the diagnosis it is not only necessary to recognise that jaundice is present, but also to determine its cause.

Other topics of interest that are dealt with in this volume include the reticuloses, leprosy, liquid granuloma, lupus vulgaris and lymphogranuloma inguinale. A chapter of special interest is that dealing with law in relation to surgery—a subject which is so often neglected in the standard works on surgery. The same remarks hold for the chapter on artificial limbs.

Throughout, the high standard set in the previous four volumes is maintained and the same delightful style is still apparent and makes pleasant reading.

## BLOOD TRANSFUSION

*Blood Transfusion.* By Elmer L. Degowin, M.D., Robert C. Hardin, M.D. and John B. Alsever, M.D. (Pp. 587 + xii. With 200 diagrammatic drawings. 60s. 9d.) Philadelphia: W. B. Saunders Co. 1949.

*Contents:* 1. Introduction. 2. Clinical Use of Blood and its Derivatives. 3. Immunology of Blood. 4. Technical Section. 5. Transfusion of Whole Blood. 6. Preparation and Administration of Plasma. 7. Preparation and Administration of the Blood Derivatives and Plasma Substitutes. 8. Transfusion Services. 9. Transfusion Apparatus. Index.

This is undoubtedly the most useful book on the subject which has appeared to date. All three authors are clinicians—two of them physicians and one a surgeon—who have been prominently associated with the management of their own hospital transfusion services, with the Red Cross Blood Plasma Program, and with the organization and management of blood transfusion in the United States army during the last war. As the writers rightly emphasize, the development of knowledge and technique have proceeded to a point where blood transfusion must be recognized as a minor medical specialty, not merely the extension of a laboratory service. The emphasis throughout is on the use of whole blood transfusions which, as clinicians, the authors consider to be the major need in the treatment of patients and a more intricate subject than is the processing and administration of plasma or its derivatives.

The book is beautifully produced, one of its outstanding features being the line drawings illustrating the technique of blood grouping and antibody titrations. These should prove invaluable in the training of technical personnel. In the sections on the preservation of blood and plasma, the advantages of commercially prepared vacuum containers are stressed and there is a step-by-step description of the technique of preparation and control of plasma—liquid, frozen and dried—in accordance with the minimum requirements of the National Institute of Health of the U.S.A.

The book is concisely written, and the references cited in the bibliography have been carefully selected.

## ANAESTHESIA FOR THE POOR RISK

*Anaesthesia for the Poor Risk.* By William W. Mushin, M.A. (Oxon.), M.B., B.S., F.F.A., R.C.S., D.A. (Pp. 65 + ix. 7s. 6d.) London: Blackwell Scientific Publications Ltd. 1948.

*Contents:* 1. The Poor Risk Patient. 2. Convulsions During Anaesthesia. 3. Haemorrhage and Anaesthesia Dosage. 4. Anaesthesia For Thoracoplasty. 5. Ether Impurities. 6. The Hazards of Pentothal. 7. The Ether War. 8. Refrigeration Anaesthesia. 9. Synthetic Substitutes For Morphine. 10. Analgesia in Obstetrics. 11. The Efficacy of Oily Solutions of Local Analgesics. 12. Morbidity Versus Mortality. 13. Anaesthesia By Hypnosis. 14. Some Analgesics Compared. 15. Record Cards For the Anaesthetist. 16. Continuous Caudal Analgesia in Obstetrics. 17. Reviving the 'Dead'. 18. Curare. 19. Delayed Morphine Poisoning in Casualties. 20. The Wrong Cylinder. 21. Post-Operative Chests. 22. Anaesthetics in the Pacific War Zone. 23. Concerning Relaxation in Abdominal Surgery. 24. Continuous Spinal Analgesia. 25. Regional Anaesthesia. 26. The 'Safety' of Nitrous Oxide. 27. What, No Curare? 28. Mechanical Respirators.

This delightful little book is a collection of excellent essays by a well-known anaesthetist. In the first essay from which the title of the book is drawn, the author gives sound advice to the occasional anaesthetist. The anaesthetic with which the anaesthetist is the most familiar for the operation is best for the patient, e.g., open ether in the hands of one who is accustomed to using this method is a safer anaesthetic than via a machine with which the individual has only a nodding acquaintance.

His remarks on intestinal obstruction should be digested. The type of anaesthetic or method of anaesthesia in these cases is of much less importance than the fact that the patient has an empty stomach prior to induction. The

anaesthetist should have no hesitation in passing a stomach tube on the conscious patient when necessary.

The author favours the use of ether generally, an attitude which will give comfort to many readers in this country.

Both essays on curare are stimulating and full of useful *do's and don't's*. The reviewer feels, though, that perhaps the author too light-heartedly prompts the unnecessary use of curare and pentothal for laryngoscopy and again, may mislead some readers by his words on the use of curare in thoracic surgery.

This little book is recommended to all interested in anaesthesia.

#### PRACTICAL TROPICAL SANITATION

*A Manual of Practical Tropical Sanitation.* By J. Balfour Kirk, C.M.G., M.B., Ch.B., F.R.C.P., D.P.H., D.T.M. & H. (Pp. 288 + viii. With 46 figures. 10s. 6d.) London: Baillière, Tindall & Cox. 2nd ed. 1949.

**Contents:** 1. The Cell. 2. The Anatomy and Elementary Physiology of the Human Body. 3. Communicable Diseases: Group I. 4. Worm Infections Spread through the Excreta. 5. Communicable Diseases: Group II. 6. Elementary Entomology. 7. The Insect-borne Diseases. 8. Miscellaneous Communicable Diseases. 9. Disinfection. 10. Housing. 11. Food. 12. Food (continued), Abattoirs, etc. 13. Milk. 14. Water and Water Supplies. 15. The Collection and Disposal of Sewage. 16. The Collection and Disposal of Refuse. 17. Laundries. 18. Schools. 19. Village Sanitation. 20. Miscellaneous Data.

It is refreshing to read a book on practical hygiene that lives up to its title. This book, now in its second edition, was written primarily for sanitary inspectors employed in the tropics and sub-tropics, and there is no doubt that it will be a real guide to them. Those who have had experience of such work in primitive areas will understand how great can be the gulf between what is desirable and what is possible, but Dr. Kirk confines himself strictly to the latter, so that even an untrained reader should have no difficulty in dealing with the situations that might arise.

Working details are given of a variety of subjects ranging from, e.g., the handling of a rabies epidemic to the method of cleaning a filter candle, from a scheme of dairy inspection to the keeping of a truck driver's log book. Clear illustrations support the text throughout. Sanitary law, which so often hampers the reader of books on hygiene from overseas, is omitted, making the book of general application.

The new edition brings up to date a book that will continue to be a useful source of reference and inspiration, not only for Health Inspectors and Medical Officers of Health, but especially for those working 'outside the law' on mines and plantations throughout Africa.

#### MEDULLARY NAILING OF KÜNTSCHER

*Medullary Nailing of Küntscher.* By L. Böhler, M.D. (Pp. 386 + xi. With 1,261 figures. 38s. 6d.) First English Edition. London: Baillière, Tindall & Cox. 1948.

**Contents:** 1. Operative Treatment of Fresh closed Fractures with the Medullary Nail of Küntscher without exposure of the Fracture Field. 2. Operative Treatment of Fractures with the Medullary Nail of Küntscher through Exposure of the Fracture Field. 3. Complications of Medullary Nailing. 4. The Callus Problem. 5. Infection following Medullary Nailing. 6. Fractures of the Femur. 7. Fractures of the Lower Leg. 8. Joint Fractures. 9. Fractures of the Metatarsal Bones. 10. Fractures of the Clavicle. 11. Dislocations of the Clavicle. 12. Gunshot Injuries to the Shoulder Joint. 13. Fractures of the Humerus. 14. Fractures of the Forearm Bones. 15. Fractures of the Metacarpal Bones. 16. Fractures of the Phalanges. Bibliography.

It has been said that the main surgical advance from the continent of Europe during the recent war was the intramedullary nailing of fractures. It follows logically the Smith-Petersen pin nailing of fractures of the neck of the femur, and the technique was developed first by Küntscher in Austria and later by Rocher in France. The translator enthusiastically hails this as a new milestone in the treatment of fractures. It certainly has great possibilities and the method

itself is presently at the stage where its possibilities, indications and results must be weighed and assessed.

Böhler's book, which deals with his experiences of 600 cases, is therefore important and timely. He is already prepared to recommend it for fractures of the shaft of the femur—even for fresh compound fractures, for closed transverse fractures in the middle third of the tibia and fractures in the middle third of the humerus. He admits that closed nailing of fractures of the forearm is very difficult and in his own Clinic forbids the nailing of fractures near the ends of long bones and in fresh compound fractures of the lower leg, forearm and humerus. He warns against the use of medullary nails in children.

As most of the cases here recorded were treated before penicillin became freely available, it is possible that he may later modify his views, especially about intramedullary nailing by the open method. Closed nailing entails complicated reducing instruments and the liberal use of X-rays. Already in many British schools the open method is used.

This book makes it quite clear that the principle of intramedullary already has advantages and will no doubt have more as technique is simplified, but it should not be used except under ideal conditions and by trained surgeons. It is not without dangers and there are risks of many complications. This is one of the most important lessons he teaches. The first detailed treatise on this subject, this book should be read by all who treat fractures. Its only fault, which is not so much a fault of the author as of the Continental tradition, is that there is an inordinate repetition of detail.

#### FRACTURES AND DISLOCATIONS

*Fractures and Dislocations in General Practice* (General Practice Series). By John Hosford, M.S. Lond., F.R.C.S. Second edition revised by W. D. Coltart, M.B., B.S. Lond., F.R.C.S. (Pp. 288 + x. With 87 illustrations. 21s.) London: H. K. Lewis & Co., Ltd. 2nd ed. 1949.

**Contents:** I. General. 1. Introduction. 2. Signs, Symptoms and Diagnosis. 3. General Principles of Treatment. 4. Compound Fractures. 5. Union, Slow Union and Non-Union. 6. Some Complications of Fractures. 7. Dislocations. II. Special. 8. Fractures and Dislocations of the Clavicle. 9. Fractures of the Scapula. 10. Dislocations of the Shoulder. 11. Fractures of the Humerus. 12. Dislocations of the Elbow. 13. Fractures of the Radius and Ulna. 14. Fractures and Dislocations of the Pelvis. 15. Dislocations of the Hip. 16. Fractures of the and Dislocations of the Phalanges of the Hand. 17. Fractures of the Pelvis. 18. Dislocation of the Hip. 19. Fractures of the Femur. 20. Fractures of the Patella and Dislocations of the Knee. 21. Fractures of the Tibia and Fibula. 22. Fracture—Dislocation of the Ankle. 23. Fractures of the Tarsus. 24. Fractures of the Metatarsals and Phalanges of the Foot. 25. Fractures and Dislocations of the Spine. 26. Fractures of the Ribs and Sternum. 27. Fractures of the Facial Bones. 28. Appendix.

The contents of this volume are based on the teachings of Robert Jones, Böhler and Watson-Jones and are backed by an extensive war-time experience of bone and joint injuries accumulated by the author of this edition while serving with the R.A.F. Medical Branch. Pathological and congenital varieties are not included; neither are fractures of the skull. The first seven chapters provide an excellent authoritative discussion of general principles. The potential dangers of open reduction for fractures are stressed; for fractures of the tibial plateau, emphasis is rightly placed on the need for prolonged abstinence from weight-bearing and on the disappointing functional results of open reduction; and early non-weight-bearing foot exercises for fractures of the calcaneus are given their correct importance.

There are some omissions, however, which justify inclusion in future editions. Three weeks' immobilization for shoulders after reduction of dislocation, is too brief in young patients (because of the danger of recurrent dislocation) and too long in the elderly (to avoid extra-articular ankylosis). The statement referring to fracture of the neck of the radius: 'if the head is displaced it should be removed', is dangerously ambiguous, since its removal in children gives bad results. Many orthopaedists will not agree with using a Thomas' splint for immobilizing a hip joint after reduction of dislocation, and



for a period of only four weeks. The need for immediate aspiration of haemarthrosis of the knee joint is not indicated. Wedging of plasters to correct angulation, the importance of avoiding rotation deformities and the necessity for ensuring that Böhler walking irons are long enough to by-pass the fracture and are correctly applied, are not mentioned. There is no reference to extension injuries of the cervical spine, which may require immediate laminectomy if complicated by cord injury. Infiltration of a local anaesthetic for pain is not specified under the treatment of fractured ribs. Fractures of the facial bones constitute a specialized branch. Nevertheless, the reader should be told that it is dangerous to reduce naso-maxillary fractures after 24 hours in the presence of cerebrospinal rhinorrhoea, and the efficient Klingsley extra-oral rigid bar splint with plaster headcap should also be mentioned for treating Guerin's fracture.

These criticisms are not meant to detract from the excellence of this stimulating little book. The print is clear, on paper of good quality, the illustrations are informative and there is a very useful index. The book can be recommended safely for revision of fractures before the final qualifying examinations. It should also prove useful to the intern and the busy general practitioner for a concise account of the commoner traumatic fractures and dislocations.

#### ELEMENTARY ANAESTHESIA

*Elementary Anaesthesia.* By W. N. Kemp, M.D.C.M. (Pp. 289 + xi. With 100 illustrations. 27s. 6d.) London: Baillière, Tindall & Cox. 1948.

*Contents:* 1. General Historical Resumé. 2. Physiological Considerations of Importance in Anaesthesia. 3. Pharmacodynamic Considerations in Anaesthesia. 4. Stages and Signs of General Anaesthesia. 5. Preanaesthetic Medication and Preoperative Care. 6. Inhalation Anaesthesia. 7. Controlled Respiration. 8. Endotracheal Anaesthesia. 9. Anaesthesia and Analgesia by Intravenous Administration. 10. Oral, Subcutaneous and Rectal Anaesthesia. 11. Anaesthetic Combinations. 12. Anaesthesia Adapted to the Patient's Handicaps. 13. Anaesthesia in Childhood. 14. Anaesthesia for Exodontia. 15. Analgesia and Anaesthesia in Obstetrics. 16. Anaesthesia for Thoracic Surgery. 17. Anaesthesia for War or Industrial Casualties. 18. Shock: Its Etiology, Diagnosis and Treatment. 19. Complications of General Anaesthesia and Their Treatment. 20. Spinal Anaesthesia. 21. Procedures of Common Application for Local Anaesthesia. 22. Adapting Anaesthesia to Surgical Requirements. 23. *Status Lymphaticus* or Thymic Syndrome. 24. Anaesthesia for Non-surgical Conditions.

This very modest title underrates the book. It is by no means elementary, nor one for the beginner only. It may have been prepared with the object of a *vade mecum* for the busy undergraduate or medical practitioner, but has much to recommend it to all interested in anaesthesia, particularly because of many of the author's personal impressions.

The book has been well arranged. The subject matter of each chapter is divided into appropriate sub-headings and at the end of each under 'notes' is a summary of the former. The printing and the many illustrations are excellent.

For those anaesthetists who do not regard *status lymphaticus* as an entity, the cases cited in the chapter under this heading and the author's remarks on these should be a cautious reminder; and it would do well for all to be conversant with this 'triad' of symptoms and respect them, since there are still unexplained sudden deaths in the young even under well-conducted anaesthesia.

The author's recommendation of the free use of pre-operative sedation or basal anaesthesia in children, who are easily psychologically traumatized, i.e., those between the ages of two and 12, will be welcomed by most anaesthetists; further, the reviewer is pleased to note the author's preference for scopolamine over atropine particularly in children and infants.

The chapters on physiology and pharmacodynamic considerations in anaesthesia, though brief, contain useful information, and that on *The Signs of Anaesthesia*, particularly the sub-heading dealing with eye signs, is excellent. It is rather surprising, however, not to find any mention of curare in the chapter on controlled respiration.

#### ANKYLOSING SPONDYLITIS

*Ankylosing Spondylitis.* By F. Hernaman-Johnson, M.D., F.F.R., D.M.R.E., and W. Alexander Law, O.B.E., M.D., F.R.C.S. (Pp. 200 + viii with 40 illustrations. 30s.) Butterworth & Co. (Africa), Ltd., 1 Lincoln's Court, Masonic Grove, Durban. 1949.

*Contents:* Part I. 1. The Spondylitic Syndrome. 2. Aetiology and Pathology. 3. Clinical Diagnosis. 4. Radiographic Diagnosis. 5. Some Reflections on Treatment. 6. X-Ray Treatment. 7. Vaccines. 8. Gold, Bismuth and Arsenic. 9. Thorium X. 10. General Management of Patients with Spondylitis. 11. Mental Factors. 12. Cortisone and Pregnenolone in the Treatment of 'Rheumatism' including Spondylitis. Part II. 1. Conservative Treatment. 2. Correction of the Spinal Deformity by Osteotomy of the Spine. 3. Hip Joint Reconstruction by Vitalium Mould Arthroplasty. 4. Surgical Treatment of Joints less frequently involved in Ankylosing Spondylitis.

Few diseases affecting active young adults cause such tragic results as does ankylosing spondylitis. In none is there less knowledge of the exact pathogenesis, nor fewer facilities for treating these patients who are usually relegated to the scrap heap of incurables. This new book is therefore very welcome, since its approach to this disease is realistic and yet optimistic.

The first part, by Dr. Hernaman-Johnson, describes clearly and fully the current ideas about the cause, pathology, diagnosis and treatment. It is backed by experience of 1,000 cases under treatment at the Charterhouse Rheumatism Clinic in London. Valuable guidance is given on early diagnosis. The important X-ray therapy, which is most effective in the early stages of the disease, is described in detail. Preference is given to the wide-field method. Mr. Law devotes the shorter second part to the orthopaedic aspects. This section is based mainly on Smith-Petersen's pioneer work and brilliant results at the Massachusetts General Hospital (where this co-author worked as Orthopaedic Fellow), and can therefore be accepted as authoritative.

It is pleasing to see the emphasis on general aspects of treatment, so that not only the disease but also the patient as an individual receives attention. Its plea for active treatment requires team work between family doctor, physician, radiologist and orthopaedist.

The value of future editions would be enhanced by statistics to indicate more exactly the remote functional prognosis; the clarity of most of the X-ray illustrations could also be improved upon. Apart from these minor criticisms, the reproduction leaves nothing to be desired.

This monograph provides the most up-to-date, comprehensive account of a subject which is not covered adequately by standard textbooks, and will undoubtedly become an invaluable reference for the successful investigation and treatment of ankylosing spondylitis.

#### PSYCHIATRISTS AND TUBERCULOSIS

*A Psychiatrist Looks at Tuberculosis.* By Eric Wittkower, M.D. Introduction by John Rickman, M.D. (Pp. 151. No price stated.) National Association for the Prevention of Tuberculosis. London: 1949.

*Contents:* 1. The Behaviour of Tuberculous Patients. 2. Factors Determining the Behaviour of Tuberculous Patients. 3. The Relevance of Emotional Factors in the Aetiology and Course of Pulmonary Tuberculosis.

Dr. Eric Wittkower, who has made many notable contributions to the literature of psychosomatic problems, has attempted, in writing this little book on some of the psychological aspects of tuberculosis, to place on a scientific basis the impressions of many occupied in the care of tuberculous patients, with special reference to assessing the patient's reaction to the illness, its treatment and its implications, and the assessment of the patient's previous personality and life situation at the time of the onset of the illness, more especially with a view to trying to decide whether mental make-up has much to do with a predisposition for tuberculosis.

In his conclusions, Wittkower confirms the views held by many specialists in tuberculosis, who have long known that an unhealthy mode of life and mental upsets often precede the

onset of symptoms of tuberculosis; but he attempts to explain how this unhealthy mode of life comes about, what forms the basis, and what are the common features of the precipitating mental upsets. In explaining psychological mechanisms he admits that these fail to show why an individual should fall ill with pulmonary tuberculosis and not with some other disease.

In discussing the effect of personality factors and the course of the disease, he points out that the results of his investigations strongly suggest that the speed and chance of recovery of an individual depends, to a great extent, on his personality, and that sometimes it may be safer to assess a patient's prognosis on the basis of his personality and of his emotional conflicts, than on the basis of the shadow on the film.

The information and results of investigations to be found in this little volume should be of great interest to those occupied in the treatment of the Sanatorium patient and also in the Tuberculosis Outpatient Clinic, and the reviewer looks forward to what should be an even more important study that Wittkower hopes to do in the future, viz., data regarding the psycho-social problems of vocational rehabilitation and of village settlements in relation to the after care of the tuberculous.

## CORRESPONDENCE

### THE SPECIALIST AND I

To the Editor: I crave the privilege of a full-time government servant in writing under a *nom-de-plume* in response to the correspondence under the heading *The Specialist and I*. My confession is that I live in fear of making mistakes equal to any and all those to which 'F.Z.L.' refers.

The practice of medicine is an attitude of mind rather than the manipulation of physical and instrumental methods of examination. Because we each tend to concentrate on our individual techniques of diagnosis and preferences of treatment, we lose sight of that broad cultural background which surrounds us all. Our training as doctors begins in our childhood when we experiment in the use of our senses. As we grow up, the development varies with each of us. When we go forth into the world we are equipped with a given set of attributes. As we look back to our student days we see how our fellows have fitted themselves in a type of medical practice suited to their endowment.

As I live in a secluded part of South Africa, I rarely have the opportunity of attending a Branch Meeting. At a recent meeting I was dismayed at how the practice of medicine has been cut up during the last decade. The practitioner who is both able, and whose interests in medicine are protean, is becoming a back number. He is being edged out of hospital positions, thereby excluding him from the investigation and the treatment of the sick. It is true that in general practice our lives are in close contact with those of our patients, and hence one witnesses the first departures from the normal; but without the experience of hospital practice one is, on occasions, at a loss in the interpretation of these early signs of abnormality. In this matter I write with some knowledge as I live more than 40 miles from my nearest medical colleague.

I am sure that great good will come to our patients and that great benefit will accrue to our profession if we constantly remind ourselves that, firstly, we are all observers of people, of sick people, and of disease processes; and that, secondly, we must be ruthless in discarding obsolete ideas and in the acceptance of principles of action which are to the well-being of the sick person.

As a profession our purpose is one. Although we should not be guilty of any shortcoming, we have our lapses. We have much in common with one another.

'Black Eye'

13 December 1949.

### CORNEAL GRAFTING

To the Editor: I read with interest Dr. C. J. Blumenthal's excursion into semantics (this *Journal*, 10 December 1949). He uses the word 'syphilitic' in a special sense to signify a

lesion 'with serological tests positive'. The word surely had a place in medical terminology before the advent of Wassermann, Kahn and their followers. Would your correspondent have us avoid the use of the term in, say, a lesion in the tertiary stage which has all the clinical and pathological attributes of syphilis and in which the Wassermann test is negative? I cannot subscribe to the view that our choice of the word should be censored by the biological laboratory and believe that the esoteric use of simple words should be avoided.

In the same letter the writer states that surgeons should think twice about grafting 'hopelessly scarred corneae'. This is mere tautology. The operative word here is 'hopeless'. If the surgeon decides that the case is without hope he will naturally apply the principle of *noli me tangere*.

Your correspondent here adopts what the late Professor Stebbing, of the chair of Logic of London University, showed to be a common tactic on the political platform: that of imputing to an opponent a view that he does not hold and then proving that he is wrong. I do not advocate interference in 'hopeless' cases. I differ from your correspondent merely in what I consider to be the indications and limitations of corneal grafting.

S. Etzine.

508 Castle Mansions,  
Eloff Street,  
Johannesburg.  
14 December 1949.

To the Editor: Dr. C. J. Blumenthal (this *Journal*, 10 December, p. 1018) seems to assume that every patient with positive serological evidence of syphilis must suffer from the disease in an active form. There are many cases of acquired and congenital syphilis in which clinical 'cure' is not accompanied by reversal of positive serum tests. After adequate treatment (as determined by results and by experience) of patients with interstitial keratitis, it is not uncommon to find that serum tests remain positive for very long periods without any evidence of re-activation of disease.

I cannot speak of corneal grafting, but I have seen a number of cases of congenital and late acquired syphilis in which plastic repair of facial defects has been successfully accomplished after adequate antisyphilitic treatment and in spite of persistently positive serum tests.

It seems to me that Dr. Blumenthal has set his criteria for fitness for operation too high, and may sometimes unnecessarily restrict his field of operation.

James Marshall.

140 Lister Building,  
Johannesburg.  
14 December 1949.

### MEDICAL FILM CATALOGUE

To the Editor: Three years ago a short catalogue was compiled listing the sources and titles of medical films available in South Africa. The popularity of this catalogue proved its value, but since then the titles of many more medical films have been noted and it has now been decided to prepare a new catalogue which, it is hoped, will include brief notes on each film, in order to indicate suitability for the various audiences who use medical films.

So that the catalogue may be as complete as possible, an urgent appeal is made to anyone who knows of any medical films available in South Africa. Titles listed will not necessarily indicate that the films are to be made available to the public, so owners of privately made films are invited to co-operate and to indicate whether, and under what conditions, their films will be made available for screening. By having this information available future film makers will be saved from making films on subjects which have been dealt with adequately in previous films.

Commercial firms are also invited to submit details of films in their libraries for inclusion in the catalogue. All information should be sent to the undersigned, c/o Louie Court, Alexander Road, Muizenberg, C.P.

S. M. Lewis, M.B., Ch.B.

15 December 1949.